

KINGFISHER K-X11

Universal Bonding



ADMIXTURE FOR CONCRETE AND PLASTER

Conforms to BS 8204 - Part 3

TYPE

Carboxylated styrene/butadiene copolymer, containing non-staining antioxidant.

SPECIFICATION TYPE

Kingfisher K-X11 conforms to the requirements for Bonding Agents given in BS8204 Part 3 - 1993 "Code of Practice for Polymer Modified Cementitious Wearing Surfaces".

DESCRIPTION

| | |
|---------------------------------|------------------------------------|
| Minimum application temperature | - 5°C |
| Tack free time @ 25°C | - 15 Hours |
| Full cure time @ 25°C | - 48 Hours @ 1.3mm thickness |

Advantages

Cementitious mixes containing **Kingfisher K-X11** have the following advantages:

- ★ Greatly improved adhesion to a wide range of substrates including dense concrete, glass, steel, tiles etc.
- ★ Mixes may be applied in much thinner sections
- ★ Excellent resistance to water and water vapour
- ★ A high level of resistance to salt permeation
- ★ Much improved toughness and flexibility
- ★ Reduced surface dusting of concrete
- ★ Greatly improved resistance to many chemicals
- ★ Reduced water: cement ratio for equivalent workability
- ★ Improved frost resistance
- ★ Carbonation resistance
- ★ Better protection of steel reinforcement.

In addition **Kingfisher K-X11** has the advantage over PVA bonding aids in that it is not adversely affected in wet conditions and is therefore recommended for exterior use.

TYPICAL PROPERTIES

| | |
|-------------------------|-----------|
| Total Solids | 47% |
| Specific Gravity @ 25°C | 1.01 |
| pH | 9.5 |
| Stabilisation | Non-ionic |
| Freeze thaw Stability | Good |
| MFFT | 1°C |

STORAGE

Kingfisher K-X11 is best stored at moderate temperatures to avoid the possibility of permanent damage occurring due to prolonged heat or excessive cold.

If frozen **K-X11** should be thawed slowly. **Kingfisher K-X11** should preferably be stirred before use.

Kingfisher K-X11 contains sufficient bactericides for preservation under normal storage conditions.

TECHNICAL INFORMATION SHEET



Applications

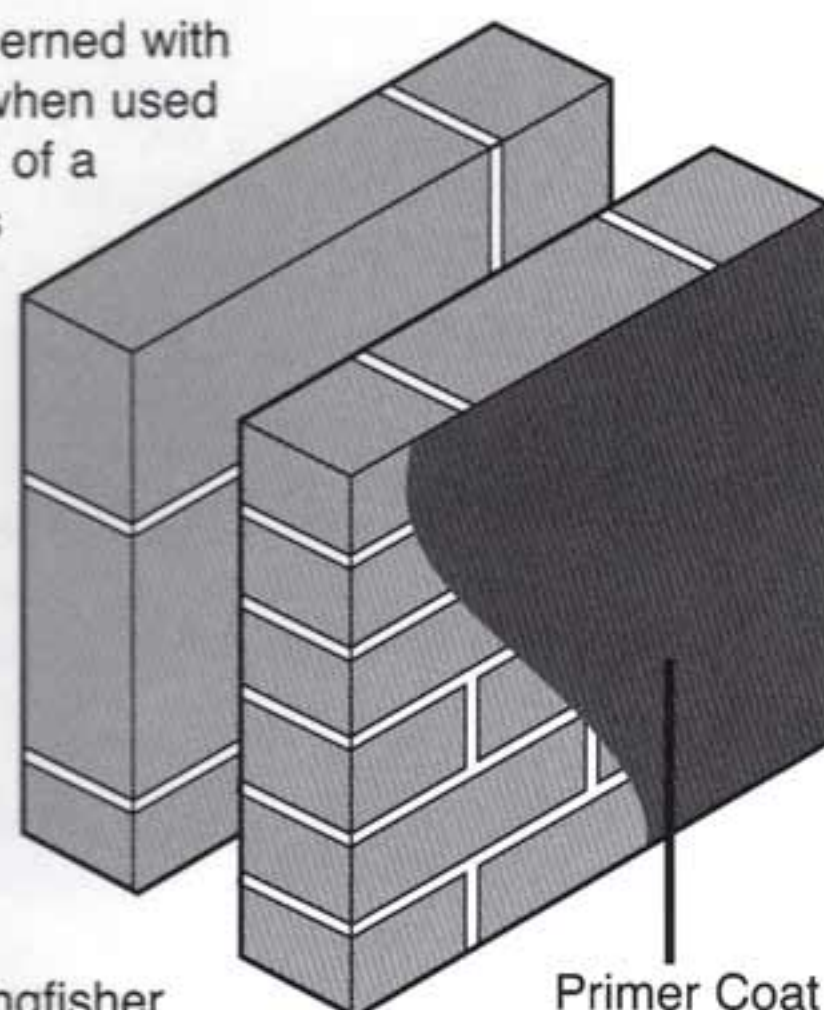
1. Floor screeds and toppings including self smoothing underlayments. Ideal background for epoxy and polyurethane finishes.
2. Bonding agents. Will bond to concrete, steel, glass, glazed tiles and wood.
3. Concrete repair systems.
4. Water resistant thin and thickbed adhesives for fixing brick slips, ceramic tiles, kerbstones, wall capping stones, etc.
5. Mortars and renders e.g. mortar between engineering bricks and render onto expanded polystyrene. Re-pointing of brickwork.
6. Grouts.
7. Corrosion protection of steel e.g. as a primer for steel and to prevent corrosion of the steel reinforcement of concrete.
8. Sealing old concrete (e.g. garage floors) and asbestos sheets. Anti-dust.
9. Roof screeds. Filling depressions in flat roofs.
10. Waterproof internal linings for swimming pools and concrete water tanks.
11. Correcting wall and floor levels in new buildings, where there has been a design or workmanship problem.
12. Improving Glass Reinforced Cement Products. In addition to the normal benefits obtained from the use of **Kingfisher K-X11** cementitious systems, it aids dispersion of the fibres.

Market Areas

Kingfisher K-X11 is used in site maintenance work, in new work on site, and in precast concrete factories.

PRIMER SYSTEMS

This section is concerned with **Kingfisher K-X11** when used with cement as part of a primer system or as a bonding agent. The application of a primer/bond coat is recommended to obtain reliable adhesion of a subsequently applied render, repair mix or floor topping. In addition, site trials have shown that Kingfisher K-X11 can be very effective in improving the adhesion of plaster to difficult substrates.



Primer Coat

Uses

Suggested uses of **Kingfisher K-X11** in primer systems:

- Corrosion protection of steel
- Waterproofing
- General purpose building adhesives
- Bonding agent

Selection of Materials

The Portland cement should be fresh but cool, and cement containing air set lumps should not be used.

Preparation of Surfaces



Preparation e.g. wire brushing

Before using **Kingfisher K-X11** based primer it is important to ensure that the surface to which it is to be applied is clean and free from dust and loose material, and has sufficient mechanical strength.

It is recommended that concrete or masonry surfaces are well dampened an hour or so before priming (unless already damp e.g. basement walls) and should be damp but surface dry when the primer coat is applied.



Dampen surface

Mix Design

The optimum proportions of cement and **Kingfisher K-X11** depend upon the background application and properties required. The following is a typical example:

O.P.C. 1 to 2 parts **K-X11** 1 part

All parts are by volume.

The level of cement may be varied to obtain the required consistency.

Coverage Rate

This will depend upon the **K-X11**/cement ratio and the background. Typical coverage rate on rough concrete is 0.3 to 0.4 litres of **K-X11** per m² per coat.

When used as a coating, as opposed to a bonding agent, the thickness of each coat should not exceed 0.5mm to minimise the risk of cracking.

Mixing

Add the cement gradually to the **K-X11**, stirring continuously. Stir with a slow speed electric drill fitted with a paddle.



Mixing

Pot Life

The mix has a pot of life of 2 hours at 20°C.

Application



Primer coat

When used as a bonding agent below mortars, renders, screeds and toppings the priming mix must be vigorously brushed into the prepared background and the mortar, etc. applied while

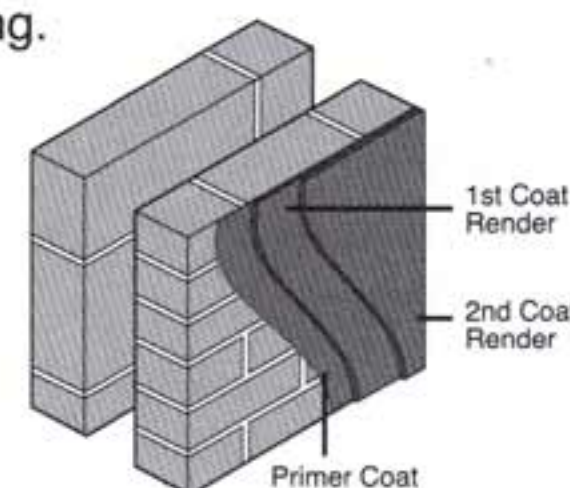
the priming coat is still wet or tacky, usually this should be within 20 minutes depending on conditions.

RENDERING

This section is concerned with the use of **Kingfisher K-X11** in rendering.

Adding **Kingfisher K-X11** to a render mix gives the following advantages:

- A reduction in water permeability
- Improved crack resistance
- Improved durability
- Greater protection against carbonation
- **Kingfisher K-X11** has a long and successful track record of use in the construction industry



Selection of Materials

To obtain maximum performance from mixes modified with **Kingfisher K-X11** it is important that attention is paid to the choice of the other materials used.

- Sand should be well washed and sharp
- Cement Portland, High Alumina and Sulphate resisting cements are compatible with **Kingfisher K-X11**

Masonry cement may lead to excessive air entrainment in **Kingfisher K-X11** mixes. The cement should be fresh but cool and cement containing air lumps should not be used.

- Use of lime. If lime is used in the mix, it should not exceed 25% of the cement by volume
- Air entraining agents. These should not be used.

Preparation of Surfaces

Before using a modified mortar or concrete it is important to ensure that the surface to which it is to be applied is clean and free from dust and loose material and that the structure has sufficient mechanical strength.

Walls should be wire-brushed and any old paint etc. removed. All contaminants such as oil, grease or any surface laitence must be removed to ensure adequate development of bond when the render is applied.

Primers

A primer coat is recommended to obtain maximum adhesion of the render. Details on the use of primers are available in the section on primer systems.

Mix Design

The optimum proportions of cement, sand and **Kingfisher K-X11** depend upon the background application and properties required. The following are typical examples:

Example 1. Standard rendering over moderately strong backgrounds, e.g. typical brickwork.

| | |
|--|-------------|
| O.P.C. | 1 part |
| Moist sand | 4.5 parts |
| Kingfisher K-X11 | 0.2 parts |
| Water | As required |
| i.e. 5 litres of K-X11 per 25 kg bag of cement. | |

Example 2. Waterproof rendering above ground, over strong backgrounds, e.g. dense concrete and also for carbonation protection.

| | |
|---|-------------|
| O.P.C. | 1 part |
| Moist sand | 3 parts |
| Kingfisher K-X11 | 0.28 parts |
| Water | as required |
| i.e. 7 litres of K-X11 per 25 kg bag of cement. All parts are by volume of uncompacted material. | |

Coverage Rate

As a rough guide, 1 litre of **K-X11** will cover 1m² at a 15mm thickness (for mix 1 above).

Mixing

Mixing procedure for renders containing **Kingfisher K-X11** is similar to that used for conventional compositions, with gauging water being partly replaced by the **K-X11** and mixing minimised to limit air entrainment.

Mixing should preferably be carried out in a forced action mixer. The usual procedure is to pre-mix sand and cement in the mixer, pour in the **K-X11**, mix for 1 to 2 minutes, and then slowly add water to the required consistency.

N.B. Over addition of water causes rapid thinning of **K-X11** modified mortars owing to the plasticising effect of the **K-X11**.

Pot Life

The mix has a pot life of approximately 1 hour at 20°C and batch size should be calculated accordingly.

Application

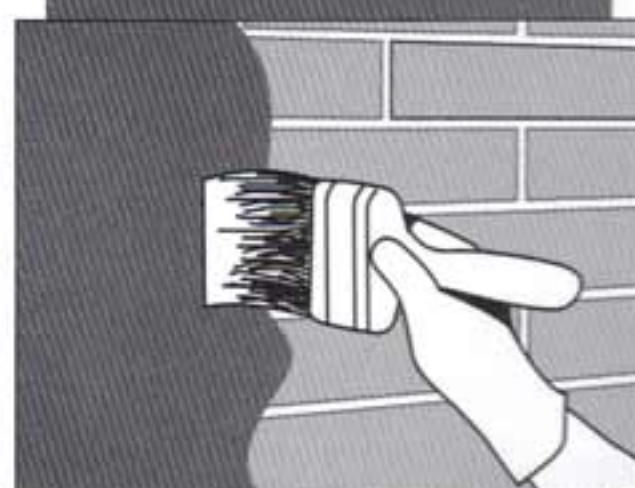
1. Apply render onto wet or tacky primer. The first coat should be limited to a thickness of approximately 7 mm.
 2. Scratch the surface and leave to set before applying the second coat of similar thickness to the first.
- For added protection, allow first coat of render to dry overnight and then apply a second coat of primer. While this is still wet or tacky, apply the second coat of render.
3. The final coat should be trowelled/floated to a smooth finish as the work proceeds.
 4. In severe drying conditions a render should be kept damp for 2 days to allow the cement to cure.

Cleaning of Equipment

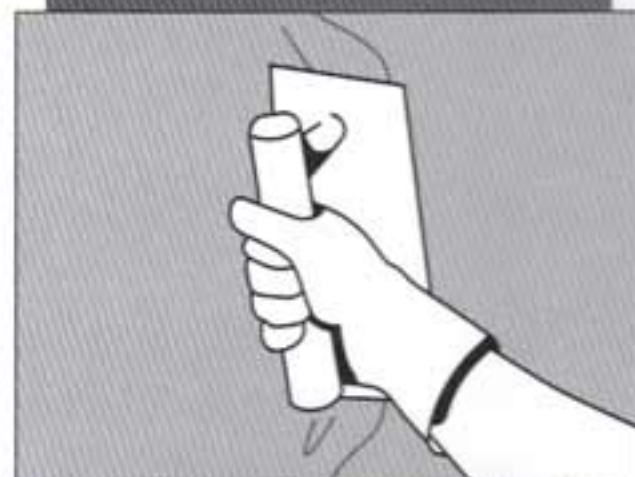
All tools should be cleaned immediately after use with water because hardened modified renders have excellent adhesion and are therefore difficult to remove. Solvents such as white spirit used with coarse wire wool help to remove partially hardened mortar.



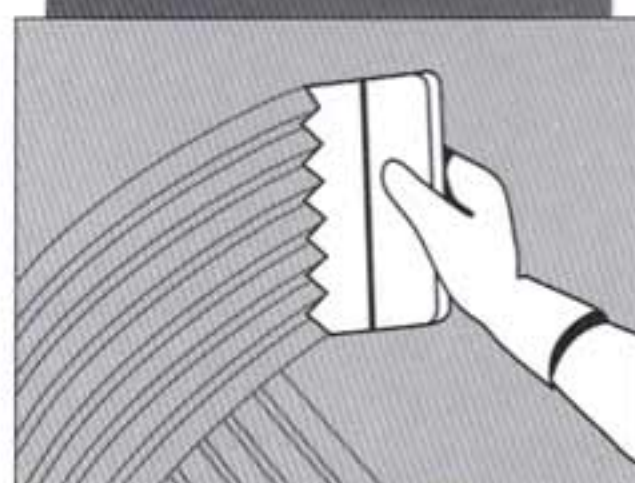
Preparation



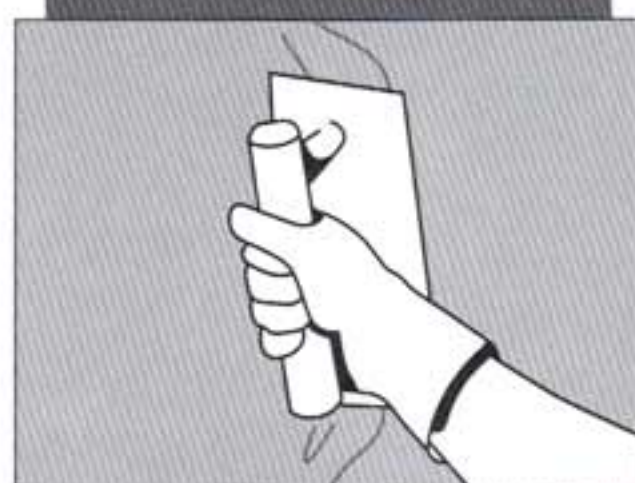
Application of primer



Apply first coat render



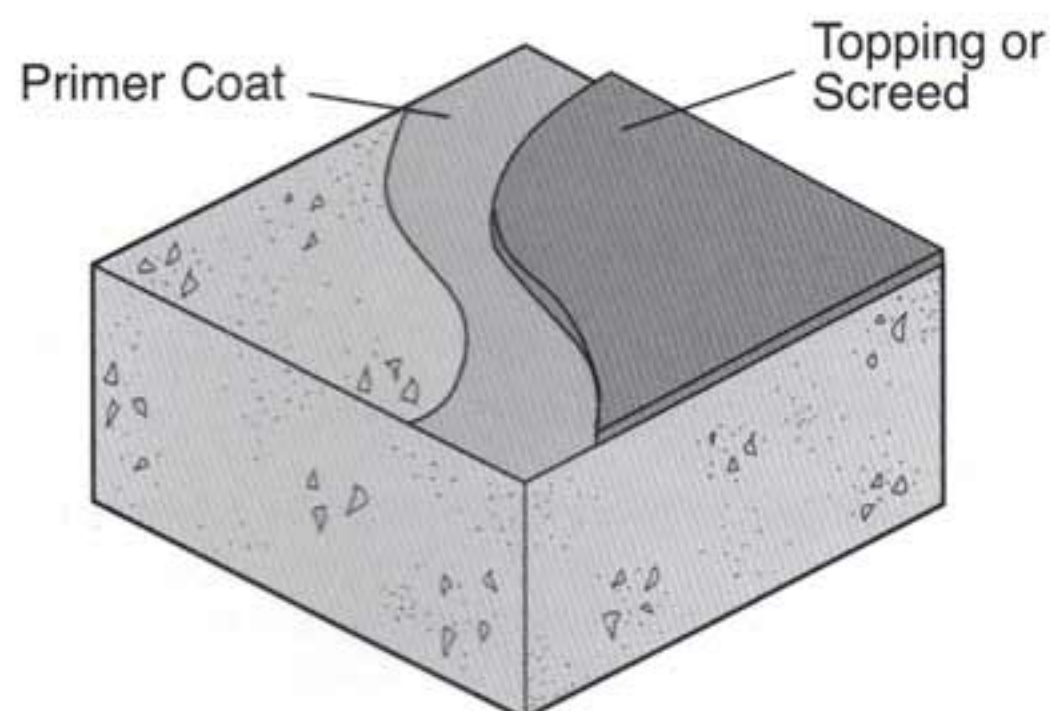
Scratch coating to add key



Second coat render

KINGFISHER K-X11 - FLOORING APPLICATIONS

This section is concerned with the use of **Kingfisher K-X11** in screeds and toppings over background concrete.



Adding **Kingfisher K-X11** to a floor screed or topping gives the following advantages:

- A low water:cement ratio allows a minimum of delay when overcoating is required.
- Reduced permeability to liquids.
- Improved chemical, abrasion and impact resistance.
- Resistance to dusting.
- Thinner screeds, achieving reduction in weight and savings in materials.
- Excellent slip resistance.
- Good underlay for epoxy surfacing.
- **Kingfisher K-X11** has a long and successful track record of use in the construction industry.

Selection of materials

To obtain maximum performance from mixes modified with **Kingfisher K-X11** it is important that attention is paid to the quality of the other materials used.

- **Sand** should be well washed and sharp. The grade of sand will depend upon the mix design.
- **Cement** Portland, High Alumina and sulphate resisting cements are compatible with **Kingfisher K-X11**. Portland cement should be fresh but cool. Cement containing air set lumps should not be used.
- **Coarse aggregate** e.g. Granite chippings. These should be dust free.
- **Air entraining agents** These should not be used.

Substrate requirements

The background must be capable of withstanding all stresses which will be put onto it and contain the appropriate joints. If it is to receive a topping the background should have a compressive strength greater than 30N/mm², and/or a tensile strength greater than 1N/mm².

Preparation of surfaces



Preparation e.g. scabbling

Floors should be mechanically prepared, e.g. scabbled or shot blasted, to give an aggregate exposed surface. Dust should be removed by vacuum, not compressed air. All contaminants such as oil, grease, or any surface laitence must be removed to ensure adequate development of bond when the topping is applied. A water drop test is the simplest method to determine whether water repellent contamination is present.

Priming



Application of primer

Application of a primer coat is necessary to obtain maximum adhesion of the topping or screed. Full details are set out in the section K-X11 Primer Systems.

Mix design

The mix design depends upon thickness and intended use. However, typically mixes for a 12mm topping or screed are as follows:

| | Screed | Topping |
|--------------------|-------------|--|
| O.P.C. | 1 | 1 |
| Moist sand | 3.5 | 1.75 |
| 3mm washed granite | 0 | 1.75 |
| Kingfisher K-X11 | 0.2 | 0.2 (i.e. 5 litres K-X11 per 25Kg bag of cement) |
| Water | As required | As required |

All parts are by volume of uncompacted material. Other suggested mix designs are available on request.

Coverage rate

As a rough guide, 1.2 litres of **K-X11** will cover 1m² of 12mm thickness using the above mixes.

Mixing

Mixing procedures for topping and screeds containing **Kingfisher K-X11** are similar to those used to conventional compositions, with gauging water partly replaced by K-X11 polymer. However, mixing time should be minimised to limit air entrainment.

Mixing should be carried out in a forced action mixer. The usual procedure is to pre-mix sand and cement in the mixer, pour in the K-X11, mix for 1-2 minutes, then slowly add water to the required consistency.

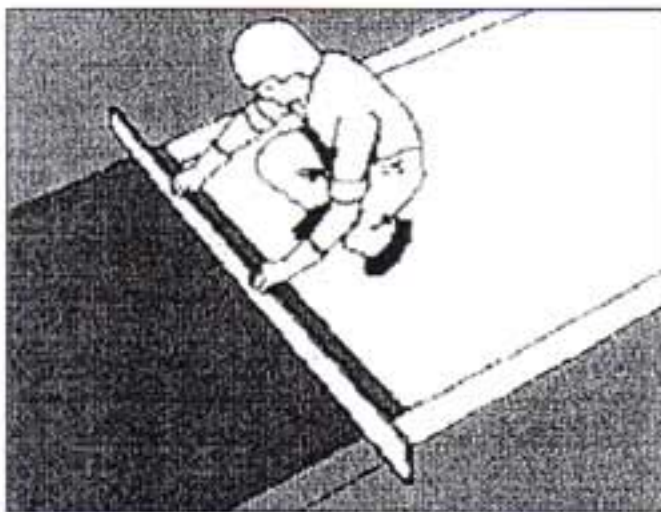
NB. Over addition of water causes rapid thinning of **K-X11** modified mortars owing to the plasticising effect of the **K-X11**.

Pot life

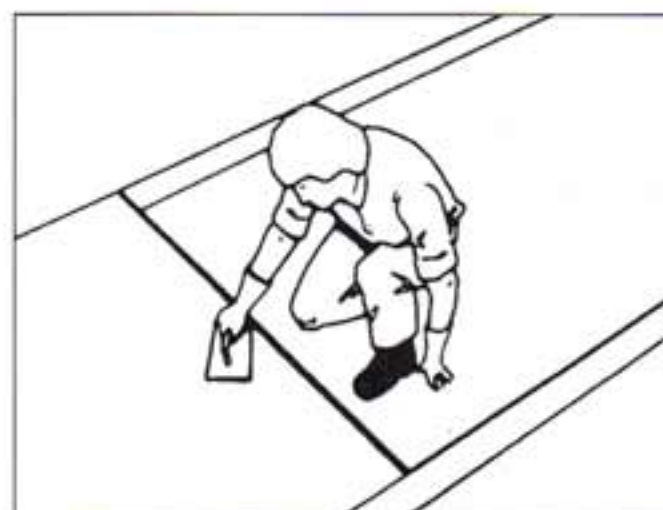
The mix has a pot life of approximately 30 minutes and batch size should be calculated accordingly.

Application

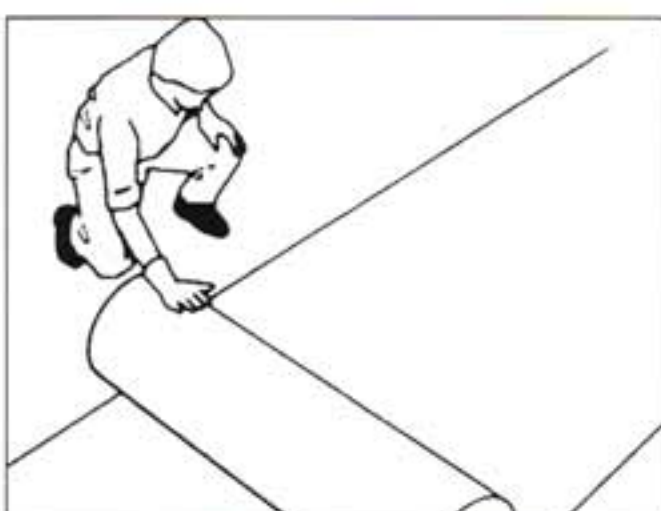
1. Apply topping or screed onto wet or tacky primer.
2. Compact and level with screed bar.
3. Finish with steel float. It is essential that the topping or screed is finished as the work proceeds.
4. The topping or screed should be cured for 1-2 days using conventional techniques. Curing should be started quickly after application.



Applying floor topping in bays



Smoothing Surface



Curing surface e.g. polythene

Notes

Joints in the screed or topping should coincide with the joints in the background.

It is easier to lay the mix if the ambient temperature is below 25°C.

If overcoating the screed, oleoresinous floor finishes should be avoided.

If the water drop test indicates the presence of water repellents, it may be more suitable to use an epoxy primer in place of the **K-X11**/cement primer.

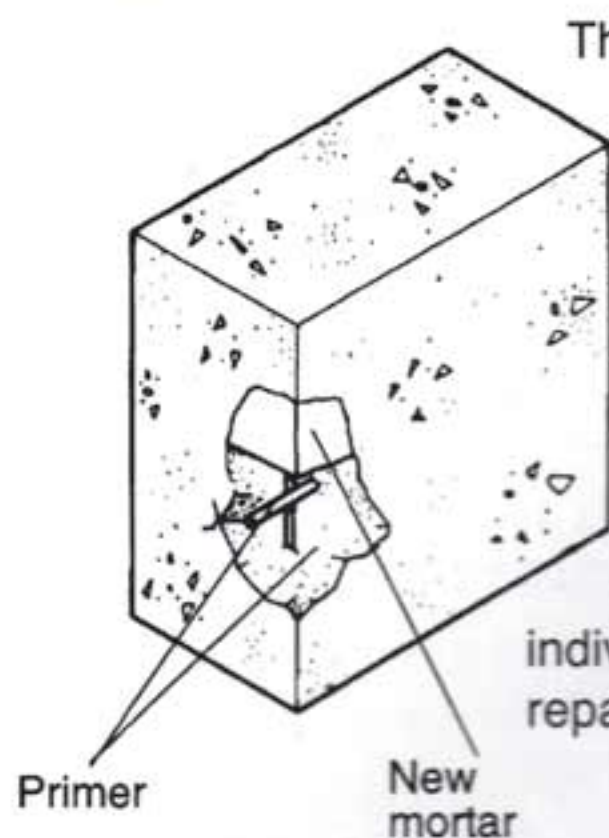
Cleaning of equipment

All tools should be cleaned immediately after use with water because hardened **K-X11** modified toppings and screeds have excellent adhesion and are therefore difficult to remove. Solvents such as white spirit used with coarse wire wool help to remove partially hardened mortar.

Other applications

Information sheets are available which describe the use of **Kingfisher K-X11** in priming, rendering and concrete repair applications.

CONCRETE REPAIRS



This section is concerned with the use of **Kingfisher K-X11** in patch repairs of reinforced concrete.

The information given here is suitable for small repair projects. **Kingfisher K-X11** is also suitable for use on larger projects, but these should be considered individually by specialist concrete repair companies.

Uses

Use of **Kingfisher K-X11** in the concrete repair system gives the following advantages:

- Improved adhesion to background
- Corrosion protection of the steel
- Improved crack resistance
- Reduced thermal stresses because the coefficient of thermal expansion is similar to that of unmodified concrete
- Protection of background concrete from carbonation
- Improved durability
- **Kingfisher K-X11** has a long and successful track record of use in the construction industry.

Diagnosis

It is important to establish the reasons for concrete failure prior to remedial action. If the problem has been caused by, for example, chlorides, porous concrete or inadequate cover to steel, areas which appear undamaged may deteriorate at a later date.

Selection of Materials

To obtain maximum performance from mixes modified with **Kingfisher K-X11** it is important that attention is paid to the choice of other materials used.

- **Sand** should be well washed and sharp. The grade of sand will depend upon the thickness of each layer to be applied.
- **Cement** Portland, High Alumina and sulphate resisting cements are compatible with **Kingfisher K-X11**, Masonry cement may lead to excessive air entrainment in **Kingfisher K-X11** mixes. Portland cement should be fresh but cool.
- **Air entraining agents.** These should not be used.
- **Other additives.** Should only be used after seeking further advice from Kingfisher Technical Service Dept.

Mix Designs

Primer Mix

The mix design for the primer coats can be found in the separate section on primer systems.

Mortar Mix

The following mortar mix is suitable for most repairs to concrete with a compressive strength greater than 25N/mm² and where cover to the steel is above 15mm.

| | |
|--------------|---|
| O.P.C. | 1 part |
| Moist sand | 2.5 parts |
| K-X11 | 0.2 parts (i.e. 5 litres of K-X11 per 25 Kg bag of cement) |
| Water | As required |

All parts are by volume of uncompacted material.

Note: The **K-X11** level should be increased to 0.3 parts in the following cases:

- i) if the background concrete contains chlorides
- ii) if the final cover to steel will be 10-15mm
- iii) in conditions of severe exposure.

Coverage Rate

In the above mix a 25 Kg bag of cement with 60 Kg of sand will yield approximately 0.08m³ of mix.

Mixing

Mixing procedures for repair mortars containing **Kingfisher K-X11** are similar to those used for conventional compositions, with gauging water being partly replaced by the **K-X11** and mixing minimised to limit air entrainment.

Mixing should be carried out in a forced action mixer. The usual procedure is to pre-mix sand and cement in the mixer, pour in the **K-X11**, mix for 1-2 minutes, and then slowly add water to the required consistency.

N.B. Over addition of water causes rapid thinning of **K-X11** modified mortars owing to the plasticising effect of the **K-X11**.

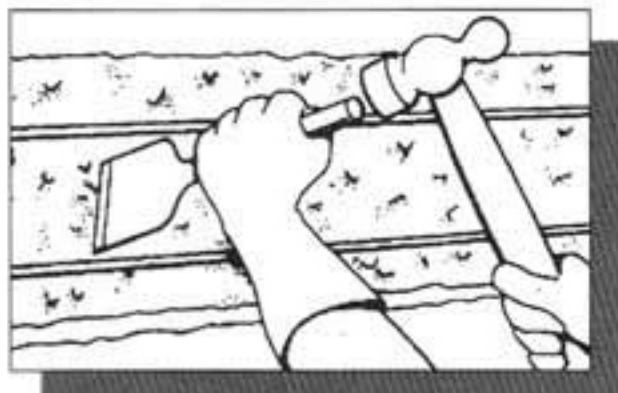
Pot Life

The mix has pot life of approximately 30 minutes and batch size should be calculated accordingly.

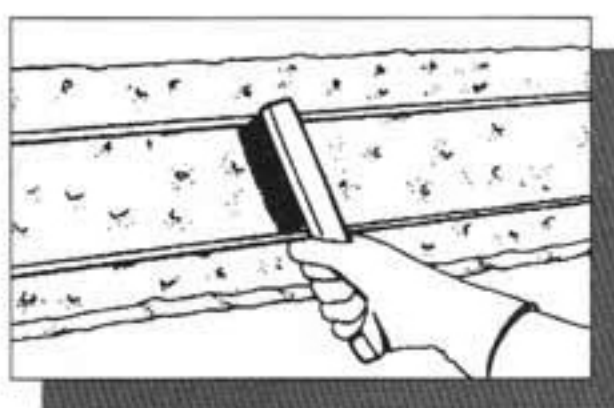
Preparation of Surfaces

A. REMOVAL OF UNSOUND CONCRETE

- Clean back mechanically to good sound concrete, preferably behind any exposed steel reinforcement. The concrete should be cut back so that the mortar can be applied to a thickness of at least 5mm at the edges of the repair to avoid feather edging. Provide at least 10mm of cover to the reinforcement.



B. PREPARATION



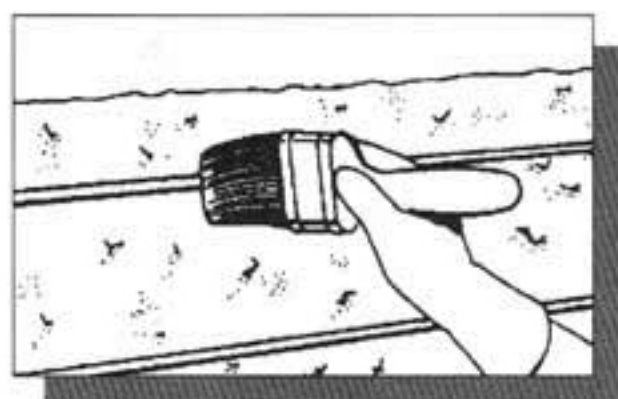
- Depending on the size of the repair abrasive blasting or wire brushing of steel is then necessary.
- The steel should be washed with clean

water and allowed to dry. Chemical cleaners and rust treatments should not be used.

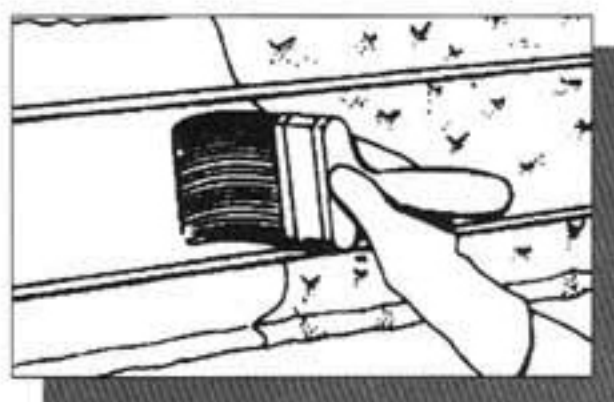
Note: If corrosion of steel appears excessive, an engineer's opinion should be sought.

C. PRIMING STEEL

- Brush primer coat on to the steel and allow to dry. This coat should be applied within 24 hours of preparation of the old concrete and steel.



D. BRUSH

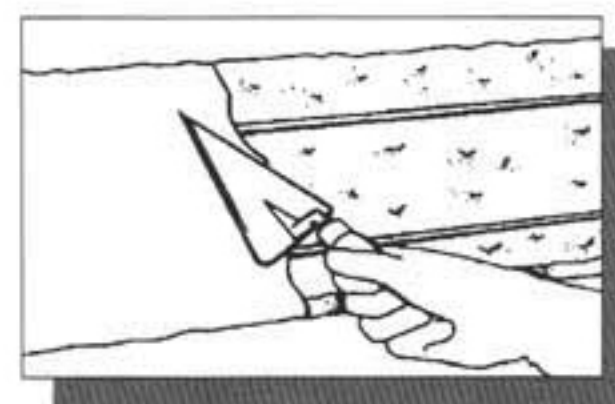


- 16-36 hours after application of first primer coat to the steel dampen surface of background concrete and allow to surface dry.

- Brush second coat of primer on to steel and background.

E. APPLY MORTAR

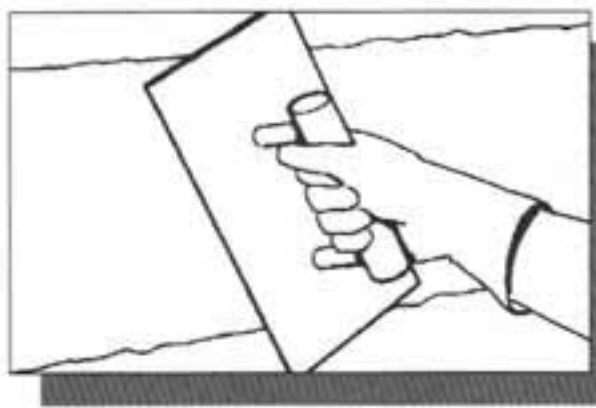
- Whilst second coat of primer is still wet or tacky, apply the repair mortar, making sure that it is well packed behind exposed steel.



N.B. The second coat of primer will only remain tacky for about 20 minutes depending upon ambient conditions.

- Where conditions require more than one layer of mortar, scratch surface of first layer and leave to just set before applying the second coat of similar thickness to the first.
- For added protection, allow first layer of mortar to dry overnight and then apply a coat of primer. While this is still wet or tacky, apply the second coat of mortar.

F. SMOOTHING OFF



- The final coat should be trowelled/floated to a smooth finish as the work proceeds.
- In severe drying conditions a repair should be kept damp

for 2 days to allow the cement to cure.

- A surface coating may then be applied over the whole area when the moisture content of the mortar is sufficiently low.

Notes:

1. If the final cover to the steel will be less than 10mm, another type of mortar may be considered e.g. epoxy.
2. Epoxy primers may be more suitable where a long open time is needed e.g. for shuttering. However, the steel will need a much higher standard of cleaning, or a layer of **K-X11** primer may be applied before using the epoxy primer.

Cleaning of Equipment

All Tools should be cleaned immediately after use with water because hardened **K-X11** modified repair mixes have excellent adhesion and are therefore difficult to remove. Solvents such as white spirit used with coarse wire wool help to remove partially hardened mortar.

Further Information

The Concrete Society Technical report No. 26 contains further information on the repair of reinforced concrete.

Kingfisher
Chemicals Limited

Ulverston, Cumbria LA12 9RA Tel: 01229 869100 Fax: 01229 869101